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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,542	11/20/2001	Charles Gregory Nelson	18973-69 (P00-3518)	2595
37509	7590	01/10/2005	EXAMINER	
DECHERT LLP P.O. BOX 10004 PALO ALTO, CA 94303			SHRADER, LAWRENCE J	
			ART UNIT	PAPER NUMBER
			2124	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/990,542

Applicant(s)

NELSON, CHARLES GREGORY

Examiner

Lawrence Shrader

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/20/2001; 5/07/2002; and 6/05/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-17 and 21 is/are allowed.
- 6) ☒ Claim(s) 18-20, and 22-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/07/2002; 6/05/20</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the application filed on 11/20/2001.
2. The information disclosure statements filed on 5/07/2002 and 6/05/2002 are acknowledged, and have been considered.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 18 and 22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The Federal Circuit has recently applied the practical application test in determining whether the claimed subject matter is statutory under 35 U.S.C. § 101. The practical application test requires that a “useful, concrete, and tangible result” be accomplished. An “abstract idea” when practically applied is eligible for a patent. As a consequence, an invention, which is eligible for patenting under 35 U.S.C. § 101, is in the “useful arts” when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The test for practical application is thus to determine whether the claimed invention produces a “useful, concrete and tangible result.”

Claim 18 recites a method of invoking a theorem prover, performing a matching function to produce plans, and a solving a satisfiability search to produce an optimal sequence of code. Claim 22 recites a method of invoking a theorem prover, introducing a multi-assignment input, performing a matching function to produce plans, and a solving a satisfiability search to produce an optimal sequence of code. These steps do not necessarily require or strongly suggest indisputable evidence that some hardware or tangible embodiment is being used because these steps can be done by virtual analysis or algorithmic computations, e.g. give a series of elementary/atomic numerical data to a calculating formula written in pseudo-code or tabular representation done on paper to yield numeric results without the use of an computer-based execution engine. The claim, as recited, amounts to an abstract idea failing to suggest an application with a tangible embodiment leading to a concrete and tangible result. Thus, the claim fails to fulfill the requirements of the practical application test and is rejected for leading to a non-statutory subject matter.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

6. Claims 1; 18; 22; 36; 39; and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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In regard to claim 1:

It is unclear how or why the steps get repeated. The “repeatedly invoking...” is, therefore, not given significant weight since it is not clear how and why the repetition occurs. It appears that code is somehow extracted as the steps end, and the code is accepted as near-optimal. Also, it is not clear how the code was made near-optimal or how to determine that the code is near-optimal.

In regard to claim 18:

The claim recites “repeatedly invoking an automatic theorem prover having a matcher and a solver...” without clearly indicating upon what the invocation is made or why a repetition should be made. On the other hand, claim 9, for example, clearly indicates that a program fragment is operated upon and why the process is repeated; claim 18 does not. Also, the steps of matching and solving are unclear. No information is given to clearly indicate what specifically is being matched, or what solving actually does to which information.

As with claim 1, it is unclear how or why the steps get repeated. It appears that code is somehow extracted as the steps end, and the code is accepted as near-optimal. Also, it is not clear how the code was made near optimal or how to determine when the code is near-optimal. The “repeatedly invoking...” is, therefore, not given significant weight since it is not clear how and why the repetition occurs.

At the end of the final limitation “...thereby automatically producing the near-optimal code sequence” does not clearly sum up the claims to this point because of the of the vague nature of the limitations described above, nor does it show where the near-optimal code comes from.

In regard top claim 22:

As similarly explained with respect to claim 18, it is not clear what the “repeatedly applying...” is applied to, nor is it clear how or why the steps get repeated.

The step of matching is unclear. No information is given to clearly indicate what specifically is being matched.

It is not clear how the code was made near optimal or how to determine when the code is near-optimal. The “repeatedly applying...” is, therefore, not given significant weight since it is not clear how and why the repetition occurs.

At the end of the final limitation “...thereby automatically producing the near-optimal code sequence” does not clearly sum up the claims to this point because of the of the vague nature of the limitations described above, nor does it show where the near-optimal code comes from.

In regard to claims 36, 39, and 40:

It is unclear what specifically is being input (“an input capable of receiving a multi-assignment;”) or where the input comes from. Also, it is not clear what is matched in order to produce the possible plans. It is also unclear how invoking the matcher and a planner adds up to (“thereby”) implementing an automatic theorem-prover for automatically generating near-optimal code.

Thus claims 1 – 4, 20; 19; 23 – 35; 37 and 38 are also rejected as they are dependent on rejected base claims.

Allowable Subject Matter

7. The following is an examiner's statement of reasons for allowance:

Prior art of record taken either singly and/or in combination, does not teach or disclose a method as recited in independent claim 9 with the following features:

While repeatedly invoking a theorem prover to prove unsatisfiable a formalized mathematical conjecture, no code sequence in a program fragment executes within a cycle budget K:

If the proof fails, a K-cycled program computing the program fragment is embedded in the failed proof,

Wherein, if the near-optimal code sequence is found, and the invocation need not be repeated, when it is established that the K-cycled program computes the program fragment and a cycle budget K-1 is insufficient, the K-cycled program is extracted as the near-optimal code sequence,

wherein, if the near-optimal code sequence is not found, for a next revocation of the automatic theorem prover if the proof succeeds the budget K is doubled; if the proof fails the proof is bisected ($K := K/2$) and a new K-cycled program computing the fragment that is embedded in the failed proof is extracted.

Thus all remaining dependent claims 10 – 17, and 21 are also allowed.

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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Shrader whose telephone number is (571) 272-3734. The examiner can normally be reached on M-F 08:00-16:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence Shrader
Examiner
Art Unit 2124

6 December 2004

Kakali Chaki
KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
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